ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

via e-mail

March 8, 2016
FPU16-191

Ms. Catherine Jerrard
AFCEC/CIBW
706 Hangar Road
Rome, NY 13441

RE: WAFB – ADEQ Comments – ST012 - *Draft Soil Vapor Extraction System/Steam Enhanced Extraction System [SVE/SEE] Operation and Maintenance [O&M], 2015 Second Quarter [2Q15] Performance Report, Former Liquid Fuels Storage Area, Site ST012, Former Williams Air Force Base, Mesa, Arizona; [ADEQ LUST File No. 0293-09 and 0293-10, ADEQ Facility ID #5338]*; prepared for Air Force Civil Engineer Center AFCEC/CIBW, Lackland AFB, Texas; prepared by Amec Foster Wheeler Environment & Infrastructure, Inc., Phoenix, Arizona; document dated December 16, 2015

Dear Ms. Jerrard:

Arizona Department of Environmental Quality (ADEQ) Federal Projects Unit (FPU) and ADEQ contractors UXO Pro, Inc. and Praxis Environmental reviewed the referenced document. General and Specific Comments are provided below.

General Comments

1. ADEQ remains concerned that the contaminant plume is not characterized. Examples include:
    a. Section 3.2.2 Perimeter Well Monitoring. The steam injection on the UWBZ perimeter, in particular to the north, was not sufficiently contained by the extraction as evidenced by the positive change in water levels at ST012-U02 and ST012-U12 (Table 3-5) and the temperature response at ST012-W36 165' (Graph 3-15).
    b. Section 3.2.2 Perimeter Well Monitoring. The steam injection on the LSZ perimeter was not sufficiently contained by the extraction as evidenced, for example, by the positive change in water level at ST012-W30 (Table 3-5) and the appearance of an LNAPL accumulation at ST012-W30 (Table 3-6).
    c. Elevated benzene concentrations in perimeter monitoring wells and steam injection on the TTZ perimeter as reported continue to be points of concern that indicate a lack of sufficient containment of injected fluids that may result in the adverse migration of NAPL away from extraction wells.
2. Please confirm if the report cover sheet ADEQ LUST/Facility identifiers (*ADEQ LUST File No. 0293-09 and 0293-10, ADEQ Facility ID #5338*) are correct for this report.

Specific Comments:

1. Page 3-10, Graph 3-1. Please separate Graph 3-1 into two separate plots, one with untreated stream readings and the second with the readings from the thermal accelerator discharges. Both graphs can then be plotted on a linear scale to display more detail.
2. Section 3.2.1.2.1 Wellfield Vapor Extraction Rate. Please provide a graph with the effluent flow rates from the air strippers and with the influent flow rates to the thermal accelerators.
3. Page 3-12, Line 1001, *"The cumulative water extraction is calculated based on flow meters installed at each of the 57 extraction wells."*
    a. Do the individual flow meters provide both instantaneous flow rate and total flow?
    b. If so, which values (rate or total) from the educator inlet and outlet are used to calculate the flow rates and cumulative flows presented in Graphs 3-4 and 3-5?
4. Page 3-16, Graph 3-8. Are the steam injection values presented in Graph 3-8 validated or correlated with measures of water usage in the boilers?
5. Page 3-20, Table 3-3. Please include a measured vapor flow rate at each location close to the time of sample collection to allow a calculation of compound mass flow rates.
6. Page 3-23, Table 3-4. Please include a measured water flow rate at each location close to the time of sample collection to allow a calculation of compound mass flow rates.
7. Page 3-42, Line 1217, *"Based on operational testing following startup, the eductor motive water pressures and flows were optimized."* What specific optimization led to the cycling of eductor pumps rather than constant, site-wide extraction?
8. Page 3-51, Line 1359. *"A correction factor is applied to thermal accelerator influent PID readings (presented in Graph 3-1) based on corresponding thermal accelerator influent analytical data (results presented in Table 3-3)."* Please include a table of the correction factors applied for the various time intervals alongside the associated analytical data.
9. Page 3-53, Table 3-11. Please include a calculation of the mass dissolved in the water entering the air stripper. The table should report the three mechanisms of mass removal: mass dissolved in extracted water, mass volatilized into extracted vapors, and mass in recovered LNAPL.
10. Page 3-53, Table 3-11. Please add a column for benzene removal by each of the three phases (dissolved, vapor, and LNAPL). The data are available (Tables 3-3 and 3-4) to perform calculations of benzene mass removal in addition to the total hydrocarbon mass removal currently reported in Table 3-11.
11. Section 3.3.2 Containment Evaluations. This section should include an energy balance that is equivalent to a volume balance. As the steam zone grows, a large mass of liquid water is displaced by a small mass of water vapor in the steam zone and the displaced liquid water should be accounted for in the mass balance. As a result, Graph 3-21 is insufficient to demonstrate containment. In addition, site heterogeneity and changes in water viscosity with temperature are not accounted for in the containment evaluation.
12. Section 3.3.2 Containment Evaluations. Comments 23 through 27 provided on the first quarterly report for SEE remain unaddressed and are included by reference to these comments.
13. Page 3-54, Lines 1403-1416. The discussion of perimeter well benzene concentrations should be moved to a separate subsection under Section 3.3.2 Containment Evaluations.
14. Page 3-54, Lines 1410-1411. *"Historically, benzene concentrations in ST012-W34 and ST012-W36 have been higher than other perimeter wells."* This statement is erroneous, as historical benzene concentrations in well ST012-W34 have generally been below 1 µg/l.

a. Please revise the text accordingly.
b. Please provide possible explanations for the increased benzene concentrations. For example, if the groundwater gradient at this location is inward toward the site, then it follows that the increased benzene concentrations may be from areas beyond well W34 that are not sufficiently characterized.

15. Section 3.3.2.1 Water Balance. The mass balance should include a momentum (i.e., pressure) balance to account for soil heterogeneity and well placement. As described in previous comments from ADEQ, the water balance is insufficient to demonstrate containment of injected flow to the defined treatment zone (TTZ) and larger heated zone (HZ).
16. Page 3-56, Lines 1481-1482. *"LNAPL accumulating in these wells during treatment may be the result of changes in hydraulic gradients caused by SEE."* The report should acknowledge that extent of LNAPL in the vicinity of these wells is unknown.
17. Appendix J. Please address the following:
    a. Table J-1. Please add "note 3" to the footnotes; "see note 3" is cited twice in the table, but there is no matching footnote.
    b. The Appendix includes only a single lab report that does not appear to be associated with any of the spill incidents listed in Table J-1 (see comment 19c below).
    c. TestAmerica analytical report No.280-70159-1. The date on the cover page is 6/12/2015. The Case Narrative indicates receipt of eleven water samples on 6/26/2014. The analytical report and associated chain-of-custody are for 1 soil sample and 1 trip blank collected on 6/2/15.
18. Appendix L. Please include units with the column headers in Appendix L. Also provide notation for the location of measures consistent with designations in the Process Flow Diagram in Appendix C of the Work Plan.

Closure

ADEQ may add or amend comments if evidence to the contrary of our understanding is discovered; if received information is determined to be inaccurate; if any condition was unknown to ADEQ at the time this document was signed; or if complementary regulatory agencies bring valid and proven concerns to our attention.

Thank you for the opportunity to comment. Should you have any questions regarding this correspondence, please contact me by phone at (602) 771-4121 or e-mail miller.wayne@azdeq.gov.

Sincerely,

Wayne Miller
ADEQ Project Manager, Federal Projects Unit
Remedial Projects Section, Waste Programs Division

cc:

Catherine Jerrard, USAF AFCEC/CIBW	catherine.jerrard@us.af.mil
Carolyn d'Almeida, U.S. EPA	dAlmeida.Carolyn@epamail.epa.gov
Terie Glaspey, AFCEC/CIBW	terie.glaspey@us.af.mil
Steve Willis, UXO Pro, Inc.	steve@uxopro.com
ADEQ Reading and Project File	